Neuron
Editorial

Reviews on the Visual Cortex: A Tribute to Hubel and Wiesel

In this issue, we honor the legacy of David Hubel and Torsten Wiesel, whose pioneering work transformed the field of visual neuroscience. From their early characterization of neuronal response properties in primary visual cortex to their analysis of how experience impacts the development of the visual system, the work of Hubel and Wiesel revealed fundamental insights into cortical architecture, function, and plasticity. The collection of reviews in this issue was inspired by the 50th anniversary of their landmark paper "Receptive fields, binocular interaction and functional architecture in the cat's visual cortex," published in the *Journal of Physiology* in 1962 (Hubel and Wiesel, 1962). While the functional and organizational principles laid out in this paper certainly set the stage for a host of subsequent studies in the visual system, its reach has extended far beyond V1. It is a true "classic" in neuroscience and has served not only to guide work in the visual system but also to inspire any neuroscientist seeking to understand how the activity of individual neurons can give rise to perception and behavior.

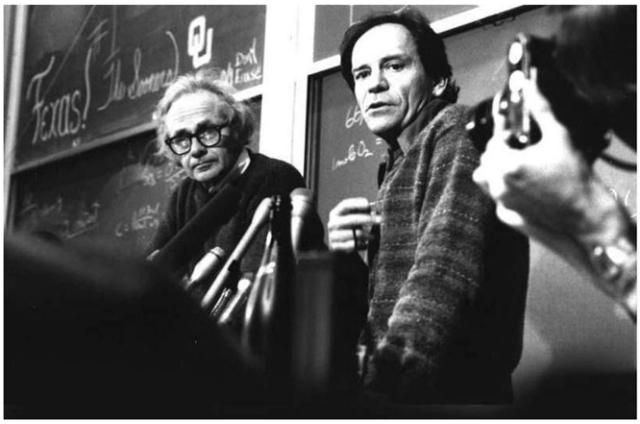

Figure 1. David Hubel and Torsten Wiesel

Given the far-reaching implications of their work, it is not possible to do full justice to Hubel and Wiesel with a limited selection of reviews. However, the following pieces, focused on primary visual cortex, provide a glimpse into how their observations have propelled future discoveries and influenced our current understanding of how sensory information is processed and organized in the brain. In their review on the mechanisms of neuronal computation, Nicholas Priebe and David Ferster consider the insights that computational approaches have provided into sensory processing in the visual system and, more generally, how the primary visual cortex has served as a model for studying cortical computation. Clay Reid puts a 21st century spin on the functional architecture described by Hubel and Wiesel, arguing that new experimental approaches are paving the way to uncovering the "functional connectomics" of the visual system. Matteo Carandini and coauthors tackle the curious phenomenon of traveling waves in visual cortex—their neural substrates, their functional roles, and how they fit into the orderly picture of V1 architecture described by Hubel and Wiesel. Sebastian Espinosa and Michael Stryker provide an overview of how studies of development and plasticity in V1 have provided clues to understanding the complexity of neural circuits. And last but not least, Charles Gilbert and Wu Li present evidence for plasticity in visual cortex after the critical period and discuss the behavioral ramifications of adult cortical plasticity.

We'd also like to draw your attention to a very special feature in this issue, a Q & A with David Hubel and Torsten Wiesel. In this piece, we asked them to reflect on their careers and what inspired them, and we encouraged them to provide some advice for the next generation of neuroscientists. We greatly enjoyed hearing what they had to say, and we hope you will too.

This issue would not have been possible without the authors, and Hubel and Wiesel themselves, and we are very grateful for everyone's contributions. On a final note, we'd also like to extend our thanks to Obi-Tabot Tabe, the artist whose work "The Cat's Eye" graces the cover. More of his work can be seen at http://www.dicotart.com and http://obitabottabe.artistwebsites.com.

REFERENCE

Hubel, D.H., and Wiesel, T.N. (1962). Receptive fields, binocular interaction and functional architecture in the cat's visual cortex. J. Physiol. *160*, 106–154.

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